

IN THE CLAIMS

1. (Currently amended) An apparatus, comprising:
a voltage regulator operable to:
regulate a supply voltage to an on-chip module having
an operational current;
draw a supply current; and
supply the operation current to the on-chip module;
wherein the supply current drawn by the voltage
regulator is proportional to the operating current of the on-chip
module;
wherein the voltage regulator includes:
a source follower portion generally operable to regulate the
supply voltage to the on-chip module; and
a drive extender portion generally operable to draw a supply
current proportional to the operating current of the on-chip
module in order to supply the operating current to the on-chip
module.

2. (Cancelled)

3. (Original) The apparatus of Claim 1, wherein the supply
current drawn by the voltage regulator includes:
a fixed current component; and
a variable current component that varies in proportion to
the operating current of the on-chip module.

4. (Original) The apparatus of Claim 3, wherein the
variable current component of the source current supplies most of
the operating current of the on-chip module during the operation
of the on-chip module.

5. (Original) The apparatus of Claim 3, wherein:
the fixed current component of the source current is

generally used to regulate the supply voltage to the on-chip module; and

the variable current component of the source current is generally used to supply the operational current of the on-chip module.

6. (Original) The apparatus of Claim 1, further comprising a current source that supplies the voltage regulator with a variable source current; and

wherein the voltage regulator supplies the operating current of the on-chip module based at least on the variable source current.

7. (Original) The apparatus of Claim 6, wherein the maximum current that can be supplied to the on-chip module by the voltage generator varies based on the variable source current received from the current source.

8. (Original) The apparatus of Claim 6, wherein the current source is a replica of a component of the on-chip module and is biased such that the variable source current supplied by the current source to the voltage regulator is equal to the maximum anticipated operational current required by the on-chip module, the maximum anticipated operational current required by the on-chip module being defined as the operational current of the on-chip module when the on-chip module operates at its maximum anticipated frequency.

9. (Original) The apparatus of Claim 8, wherein:

the current source is fabricated along with the on-chip module such that the silicon processing characteristics of the current source are similar to those of the replicated component of the on-chip module; and

the current source is located proximate the on-chip module such that the operating temperature of the current source is

similar to that of the replicated component of the on-chip module.

10. (Original) The apparatus of Claim 6, wherein:
the on-chip module is a phase-locked loop device including a plurality of half-buffers; and
the current source is a replica of one of the plurality of half-buffers.

11. (Original) The apparatus of Claim 6, wherein the on-chip module is a delay-locked loop device.

12. (Currently amended) A method, comprising:
regulating a supply voltage to an on-chip module having an operational current;
drawing a supply current; and
supplying the operation current to the on-chip module;
wherein the supply current drawn by the voltage regulator is proportional to the operating current of the on-chip module;
receiving a variable source current from a current source;
and
supplying the operating current of the on-chip module based at least on the received variable source current.

13. (Original) The method of Claim 12, wherein drawing the supply current includes:
drawing a fixed current component of the supply current; and
drawing a variable current component of the supply current,
wherein the variable current component varies in proportion to the operating current of the on-chip module.

14. (Original) The method of Claim 13, further comprising:
using the fixed current component of the source to regulate the supply voltage to the on-chip module; and
using the variable current component of the source current to supply the operational current of the on-chip module.

15. (Cancelled)

16. (Currently amended) The method of Claim ~~[[15]]~~ 12, wherein the maximum current that can be supplied to the on-chip module by the voltage generator varies based on the variable source current received from the current source.

17. (Currently amended) The method of Claim ~~[[15]]~~ 12, wherein:

the current source is a replica of a component of the on-chip module; and

the method further comprises biasing the current source such that the variable source current supplied by the current source to the voltage regulator is equal to the maximum anticipated operational current required by the on-chip module, the maximum anticipated operational current required by the on-chip module being defined as the operational current of the on-chip module when the on-chip module operates at its maximum anticipated frequency.

18. (Currently amended) The method of Claim ~~[[8]]~~ 12, further comprising:

fabricated the current source along with the on-chip module such that that the silicon processing characteristics of the current source are similar to those of the replicated component of the on-chip module; and

locating the current source proximate the on-chip module such that the operating temperature of the current source is similar to that of the replicated component of the on-chip module.

19. (Currently amended) The method of Claim ~~[[15]]~~ 12, wherein:

the on-chip module is a phase-locked loop device including a plurality of half-buffers; and

the current source is a replica of one of the plurality of half-buffers.

20. (Currently amended) The method of Claim ~~[[15]]~~ 12, wherein the on-chip module is a delay-locked loop device.

21. (Original) An apparatus, comprising:
a voltage regulator operable to:
regulate a supply voltage to an on-chip module having
an operational current;
draw a supply current; and
supply the operation current to the on-chip module;
wherein the supply current drawn by the voltage
regulator is proportional to the operating current of the on-chip
module; and
a current source that supplies the voltage regulator with a
variable source current, the current source comprising a replica
of a component of the on-chip module that is biased such that the
variable source current supplied by the current source is equal
to the maximum anticipated operational current required by the
on-chip module, the maximum anticipated operational current
required by the on-chip module being defined as the operational
current of the on-chip module when the on-chip module operates at
its maximum anticipated frequency;
wherein the voltage regulator supplies the operating current
of the on-chip module based at least on the variable source
current.

22. (Original) The apparatus of Claim 21, wherein:
the on-chip module is a phase-locked loop device including a
plurality of half-buffers; and
the current source is a replica of one of the plurality of
half-buffers.